

AMENDMENTS TO THE SPECIFICATION

Please DELETE the heading on page 1, at line 1.

Please insert the following section heading on page 1 at line 4:

-- BACKGROUND OF THE INVENTION --

Please replace the section heading on page 1, at line 5, with the following section heading:

~~TECHNICAL FIELD~~ -- 1. Field of the Invention --

Please replace the paragraph on page 1, beginning at line 7, with the following replacement paragraph:

-- The present invention relates to the field of antenna technology. ~~It relates and, more particularly, to a dual-band antenna as claimed in the preamble of claim 1.~~ --

Please DELETE the paragraph on page 1, at lines 11-12, in its entirety.

Please replace the section heading on page 1, at line 14, with the following section heading:

~~PRIOR ART~~ -- 2. Description of Related Art --

Please replace the paragraph on page 2, beginning at line 5, with the following replacement paragraph:

-- Dual-polarized antennas for base stations consisting of an array of dual-polarized individual radiators (single antennas) have been known for a long time. Similarly, dual-polarized broadband antennas are known which are composed of an array of identical dual-polarized individual radiators which are tuned to frequencies of 1710 - 2170 MHz over a wide band so that the antenna covers both the GSM 1800 band and the UMTS band. A particularly effective individual radiator of this type which has been successful in practice is known from WO-A1-01/76010 ~~by the applicant.~~ Furthermore, dual-polarized antennas are known which cover the GSM 900 band and the GSM 1800 or GSM 1800/UMTS band and which consist of an array of correspondingly tuned dual-polarized individual radiators. --

Please replace the paragraph on page 2, beginning at line 37 and continuing over onto page 3, with the following replacement paragraph:

-- ~~In the printed document US-B1-6,239,750 initially mentioned, finally,~~ an antenna arrangement for multi-band operation is proposed in which (figure 4) two linear arrays of two different patch

radiators are combined with one another, the first patch radiators being tuned to the frequency band of 1800-1900 MHz and the second patch radiators being tuned to the frequency band of 800-900 MHz and the first patch radiators being arranged alternately between and directly above the second patch radiators. --

Please DELETE the second heading on page 3 at line 18.

Please replace the paragraph on page 3, beginning at line 20 with the following replacement paragraph:

-- It is would, therefore, ~~the object of the invention be desirable~~ to create a broadband dual-band antenna which is suitable both for the GSM 900 band and for the GSM 1800 and UMTS band and is based on an individual-radiator type as has been disclosed in WO-A1-01/76010. --

Please insert the following second heading on page 3, at line 25:

-- SUMMARY OF THE INVENTION --

Please replace the paragraph on page 3, beginning at line 26 and continuing over to page 4, with the following paragraph:

-- ~~The object is achieved by the totality of the features of claim 1.~~ The core of the invention ~~consists in arranging~~ is an arrangement of first and second individual antennas in a linear periodic array, the second individual antennas being alternately arranged between the first and above the first individual antennas and the first and second individual antennas in each case being constructed as patch radiators which in each case comprise a printed circuit board arranged in a rectangular, electrically conductive box open to the top and a number of patch plates which are arranged at a distance above one another above the printed circuit board and in parallel with the printed circuit board. The special feature of this arrangement is that in this case it is not individual patch plates for different frequency bands which are arranged above one another and next to one another but that each of the patch radiators with its printed circuit board arranged in the box is used in the array. --

Please replace the paragraph on page 4, beginning at line 8, with the following replacement paragraph:

-- In this arrangement, the patch plates of an individual antenna are preferably held in each case at a distance below one another and from the printed circuit board by means of electrically insulating spacing elements (42 in figure 2). --

Please replace the paragraph on page 4, beginning at line 13, with the following replacement paragraph:

-- ~~A preferred embodiment of the invention is characterized by the fact that in the case of the In~~
a preferred embodiment, each second individual antennas in each case antenna includes three
patch plates are arranged at a distance above one another, ~~in that in the case of the and each first~~
individual antennas in each case antenna includes two patch plates are arranged at a distance
above one another, ~~and in that in the case of the first individual antennas in each case, instead of~~
a third patch plate, with the box of a second individual antenna with its box is arranged at a
distance above the upper one of the said two patch plates. ~~The~~ Each second individual antenna
is thus ~~in each case at the same time~~ a fixed component of the first individual antenna above
which it is placed. --

Please replace the paragraph on page 4, beginning at line 34, with the following replacement paragraph:

-- ~~In particular~~ Desirably, the first individual antennas are designed for covering the frequency
range of 806-960 MHz and the second individual antennas are designed for covering the
frequency range of 1710-2170 MHz. --

Please replace the paragraph on page 5, beginning at line 1, with the following replacement paragraph:

-- ~~In the general case~~ Generally, a balanced dual-band antenna is obtained if a total of N first
individual antennas and $2N+1$ second individual antennas are arranged in the dual-band antenna
(N = integral number > 0). A successful embodiment is obtained for N = 7. --

Please replace the section heading on page 5, at line 8 with the following replacement section heading:

-- ~~BRIEF EXPLANATION OF THE FIGURES~~ DESCRIPTION OF THE DRAWINGS --

Please replace the paragraph on page 5, beginning at line 18, with the following replacement paragraph:

-- figure 2 shows a section through the two adjacent first and second individual antennas of
the dual-band antenna from figure 1 along line A-A in figure 1; --

Please replace the paragraph on page 5, beginning at line 23, with the following replacement paragraph:

-- figure 3 shows ~~the~~a top view of ~~the~~a printed-circuit board of a first individual antenna ~~from-in~~ figure 1 ~~or 2, respectively~~; --

Please replace the paragraph on page 5, beginning at line 27, with the following replacement paragraph:

-- figure 4 shows ~~the~~a bottom view of the printed-circuit board of ~~a~~the first individual antenna ~~from-in~~ figure 1 ~~or 2, respectively~~; --

Please replace the paragraph on page 5, beginning at line 31, with the following replacement paragraph:

-- figure 5 shows ~~the~~a top view of ~~the~~a printed circuit board of a second individual antenna ~~from-in~~ figure 1 ~~or 2, respectively~~; and --

Please replace the paragraph on page 5, beginning at line 35, with the following replacement paragraph:

-- figure 6 shows ~~the~~a bottom view of the printed-circuit board of ~~a~~the second individual antenna ~~from-in~~ figure 1 ~~or 2, respectively~~. --

Please replace the section heading on page 6, at line 2, with the following replacement section heading:

-- ~~WAYS OF CARRYING OUT~~DETAILED DESCRIPTION OF THE INVENTION --

Please replace the paragraph on page 6, beginning at line 4, with the following replacement paragraph:

-- Figure 1 shows a top view of a dual-band antenna according to a preferred exemplary embodiment of the invention with the cover cap removed. The dual-band antenna 10 ~~contains~~ ~~in~~includes an elongated housing 11, a linear periodic array of first individual antennas (individual radiators) 14 and second individual antennas (individual radiators) 15 and 16 above an elongated baseplate 12 filling the entire housing 11. However, the width of the baseplate can also be reduced to the width of the individual antennas. The baseplate 12 can be non-metallic. However, it can also be metallic and can then act as a reflector. Arranging the individual antennas 14, 15, 16 above a reflector optimizes the front/back ratio. --

Please replace the paragraph on page 6, beginning at line 33 and continuing over to page 7, with the following replacement paragraph:

-- The basic configuration of the first and second individual antennas 14, 15 and 16 can be explained best with reference to the cross-sectional representation of figure 2. The configuration of the second individual antennas 15 and 16 is largely identical. In the case of these antennas, a printed-circuit board 22 and 27, respectively, is in each case arranged in spaced parallel relative to the bottom ~~at a distance from the bottom of the box 21, 26 in~~ of a square box 21, 26 of sheet metal which is open to the top, the double-sided conductor track or conductor area configuration of which printed-circuit board is reproduced in figures 5 and 6. Above ~~the printed circuit board~~ boards 22, and 27, three patch plates 23, 24, 25 and 28, 29, 30, respectively, which are excited by ~~the printed-circuit board~~ boards 22, and 27 and are coupled to the electromagnetic radiation, are arranged at different distance from one another in parallel with ~~the printed-circuit board~~ boards 22, and 27. The second individual antennas 15, 16 are provided for and tuned to the frequency band of 1710-2170 MHz (GSM 1800, UMTS) (UMTS radiators). Their external dimensions and patch plate distances are, therefore, smaller than in the case of the first individual antennas 14. ~~The UMTS radiators~~ Second individual antennas 15 and 16 are in each case arranged offset in height above the baseplate 12 (fig. 2). --

Please replace the paragraph on page 7, beginning at line 21, with the following replacement paragraph:

-- The first individual antennas 14, which are provided for and tuned to the frequency band of 806-960 MHz (GSM 900 et al) (900 MHz radiators) are configured similarly to the second individual antennas 15, 16. In these, a printed-circuit board 18, the double-sided conductor track or conductor area configuration of which is reproduced in fig. 3 and 4, is arranged ~~at a distance from the bottom of the box 17 in each case in parallel with~~ in spaced parallel relation with the bottom ~~in~~ of a larger, square box 17 of sheet metal open to the top. Above the printed-circuit board 18, two patch plates 19 and 20, which are excited by the printed-circuit board 18 and are coupled to the electromagnetic radiation, are ~~provided in parallel to the printed circuit board 18 at different distance from one another~~. Instead of a third patch plate, a second individual antenna 16 with its box 21 is arranged at a distance above the two patch plates 19, 20. Patch plates 19 and 20, and the base of box 21 are arranged at a different distance from one another in parallel with printed-circuit board 18. --

Please replace the paragraph on page 8, beginning at line 1, with the following replacement paragraph:

-- The printed-circuit boards 18 of the first individual antennas ~~14 and 22~~ and, ~~respectively,~~ the printed-circuit boards 22 and 27 of the second individual antennas 16 and 15, ~~respectively,~~ have different conductor tracks 31, 32 and 34, 35, respectively, on their top according to fig. 3 and 5, respectively. ~~On the bottom~~ bottoms of printed-circuit boards 18 and printed-circuit boards 22 and 27, ground areas 33 and 36, ~~respectively,~~ are provided ~~in each case~~ in which slot-shaped conductor patterns 37, 38 and 39, 40, respectively, are formed in a crossed arrangement. The individual antennas 14, 15, 16 can be fed by any type of network. --

Please replace the paragraph on page 9, beginning at line 29, with the following replacement paragraph:

-- Overall, ~~the solution filed is characterized by~~ present invention includes the following special features: --

Please DELETE on page 10, lines 18 through 35, in its entirety, entitled LIST OF DESIGNATIONS.

Please DELETE on page 13, line 1-5.